AEGIS Surface Warfare Closed-Loop Systems Engineering Using Operational Realistic Test & Evaluation

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AGENDA

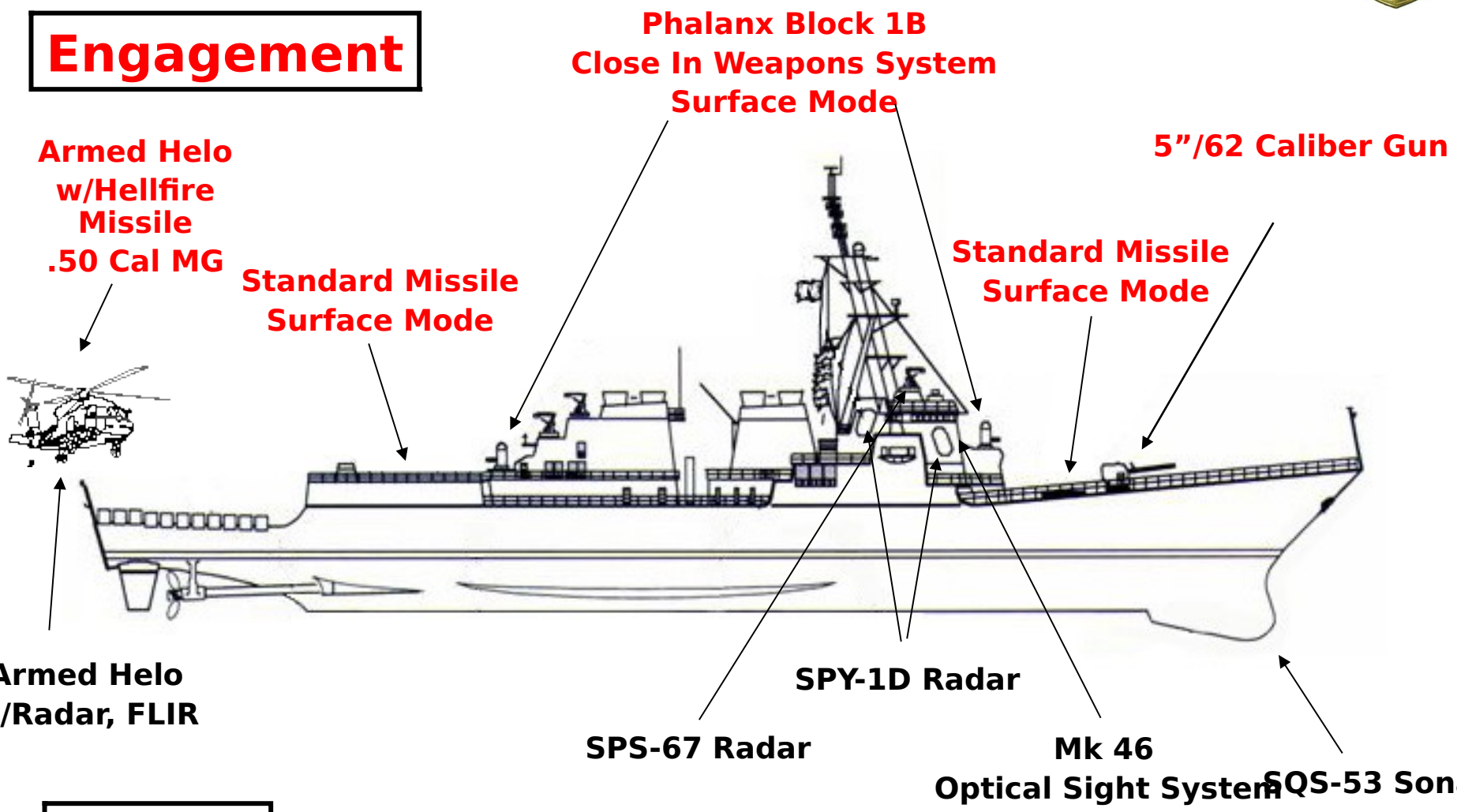
- Challenge
- AEGIS Flight IIA Destroyer Configuration
- Closed-loop SE / T&E Process & Team
- At-Sea Testing
- Summary

CHALLENGE

- **Demonstrate DDG 51 Flight IIA Surface Warfare (SUW) Performance vs. Massed Fast Patrol Boat (FPB) Raid**

FLIGHT IIA SUW CONFIGURATION

Engagement

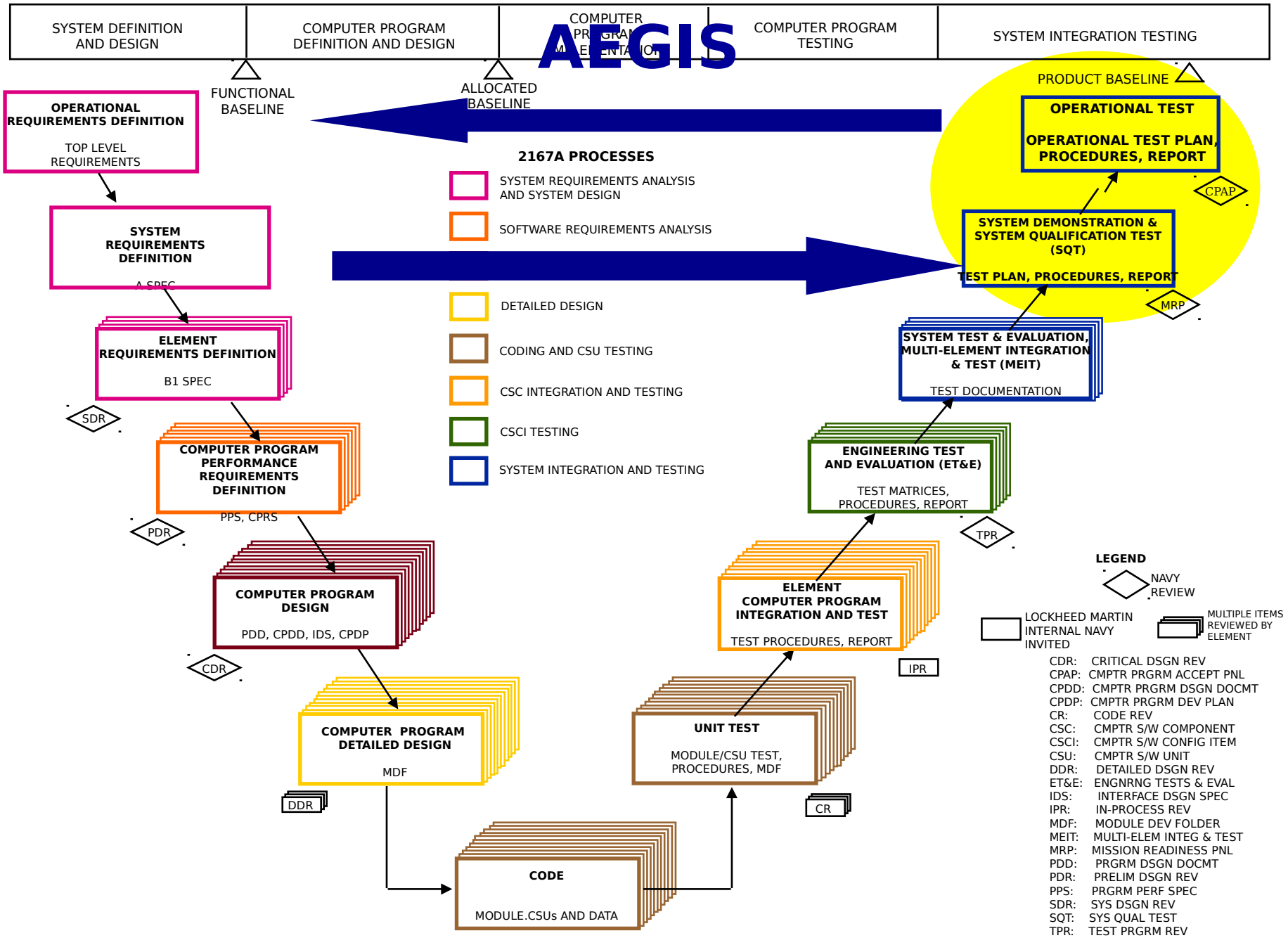


Sensor

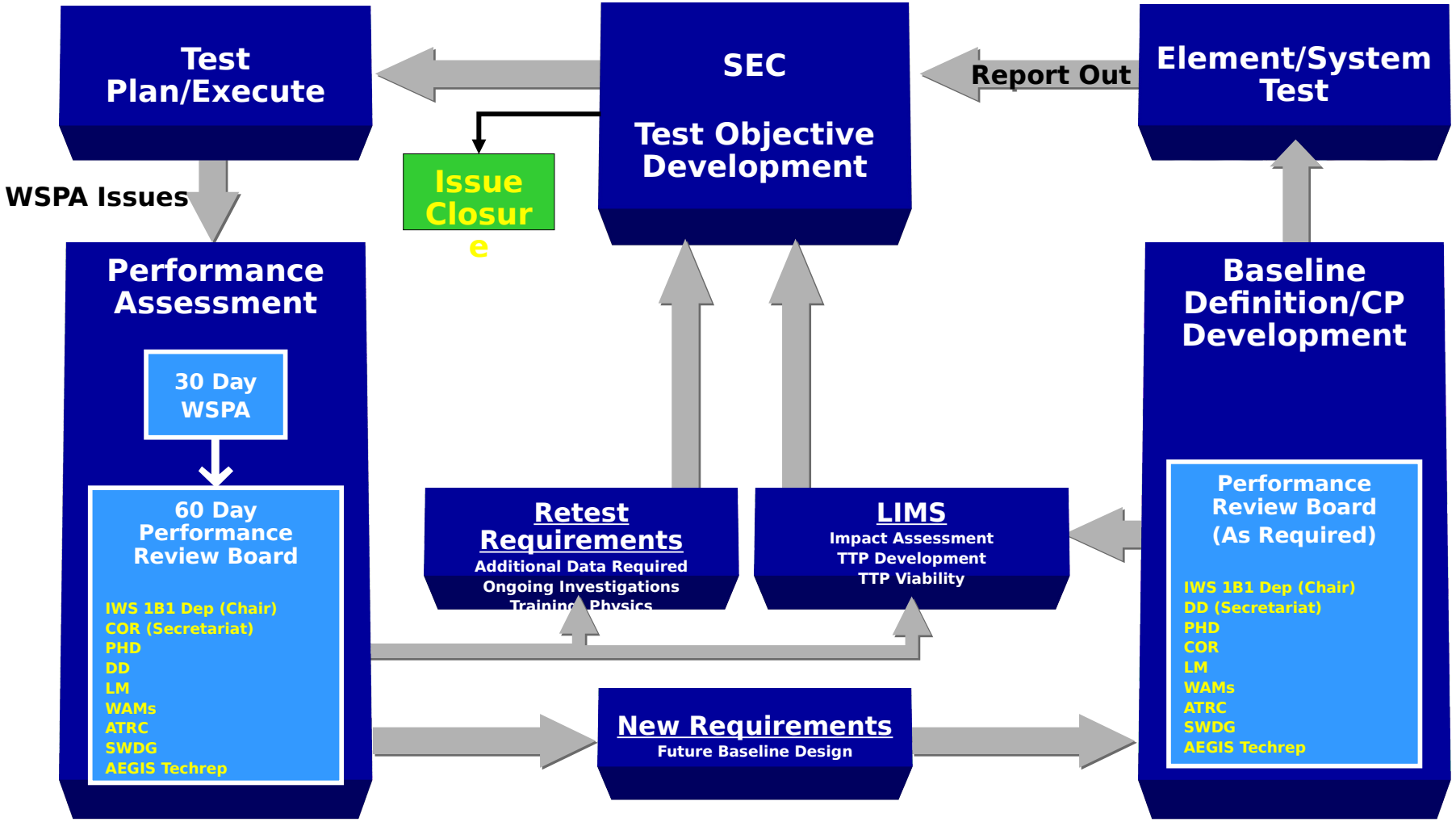
WHY “CLOSED-LOOP”?

- **Directly Link Requirements to Results**
- **Instills Rigor; At-Sea Test Time More Efficient**
- **Ensures Capture of Critical Data**
- **Ensures Operational + Technical Balance**
- **Enhances Visibility of Results**
  - Developer
  - Program Office
  - Fleet

DOD-STD-2167A INTERPRETED FOR AEGIS



AEGIS COMBAT SYSTEMS ENGINEERING PROCESS



CLOSED LOOP SE / T&E

System Engineering
Requirements
Operational Requirements
DT/OT Deficiencies
New Capability
Previous Test Results

Test Objectives (TOs)
Measures of Effectiveness
Test Kinematics

TO Assignment to Test Event

Scenario Development
Performance Predictions

Test Execution and
Data Analysis Plan

Test Plan Certification

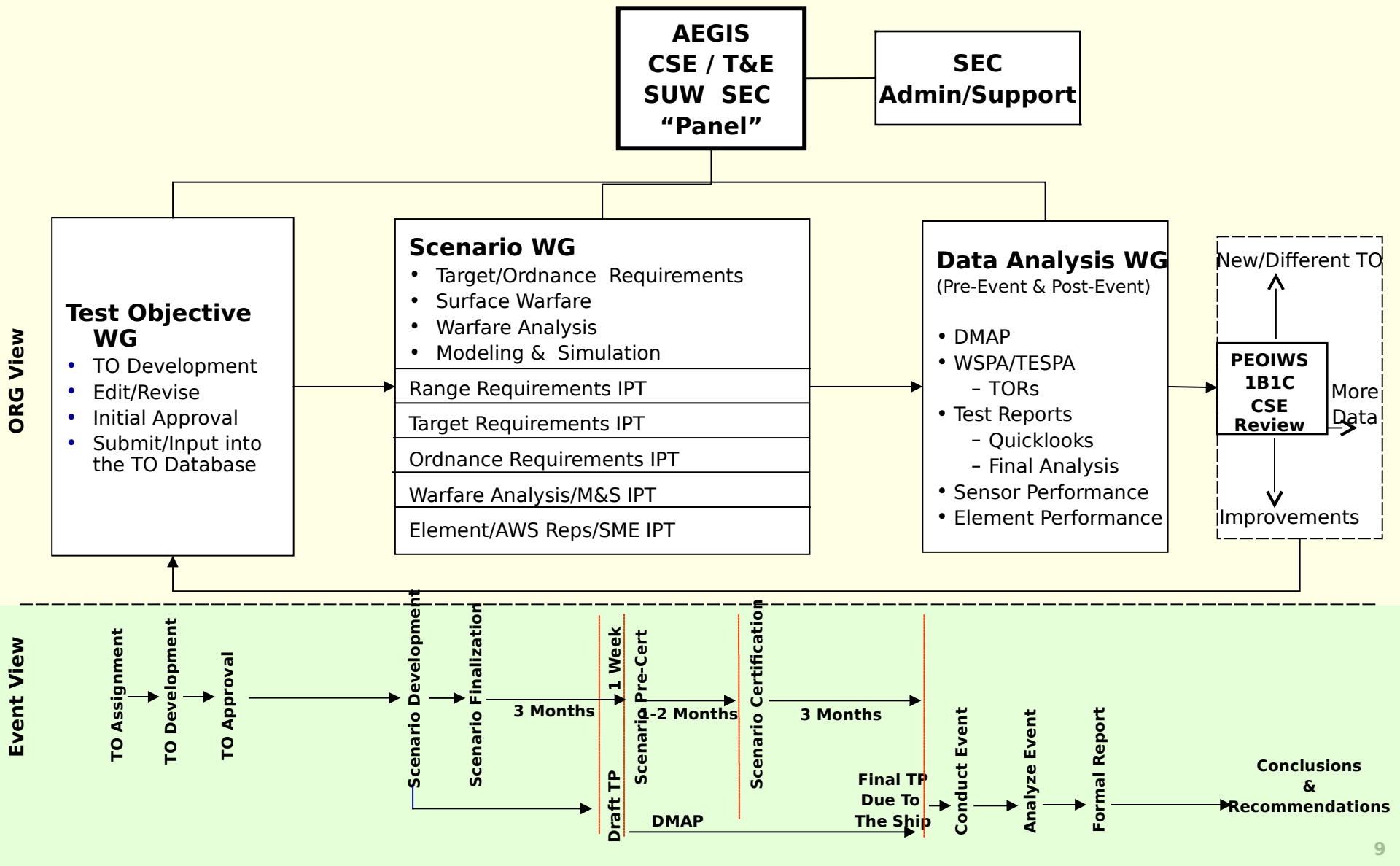
Testing

Observations
Results

Report System Performance:
Quicklooks
Test Objective Assessment
WSPA/TESPA
Semi-Annual Prog. Office Review
WSPR/TESPR

Identify Performance Deficiencies
Identify Training Deficiencies
Simulation/Validation
Retire Completed TOs

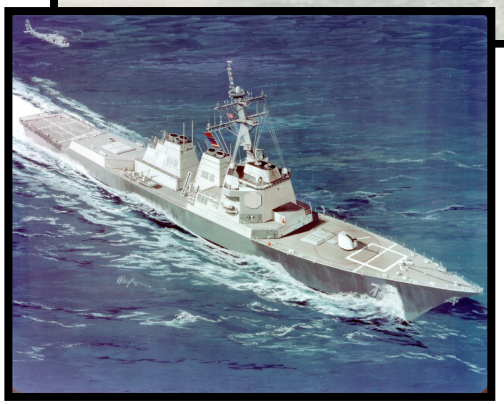
SUW SYSTEMS ENGINEERING COUNCIL



SYSTEMS ENGINEERING → AT-SEA T&E

Test Objectives

- Derived From Operational Requirements Document (ORD) and T&E Master Plan (TEMP)
- Match to Validated Threat
- Create Measures of Performance
- Verify Capability to Test

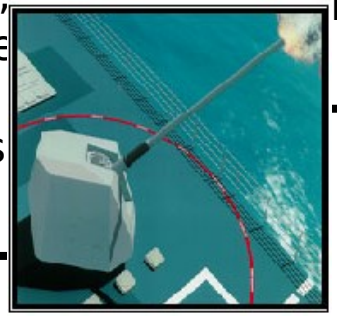


Test Planning

- Insert TO's Into Combat System Ship Qualification Trial (CSSQT) SUW Test Phase
- ID & Upgrade Range Capabilities, Target Performance and Data Collection Systems

Test Execution and Analysis

- Confirm All Systems (Ship and Range) Are Ready
- Execute Test
- Gather Weapons, Range and Target Data
- Conduct Quick-Look Analysis Onsite
- Conduct Detailed Data Analysis Working Group
- Close Loop With Updated Discrepancies and Findings For Future



READINESS BUILDING BLOCKS

Surface Events

DDG 84 801 OT HSMST Event
AFWTF, Feb 03
GWS, Armed Helo, CDF, SM-2 and CIWS BLK IB

C² & Tactics Training Range

DDG 84 CSSQT/801 DT
HSMST Event
AFWTF, Nov 4-5, 02
GWS, Armed HELO, CDF, CIWS BLK IB, SM-2

Range

Transfer Targets to AFWTF,
Conduct Range Risk Reduction Dry Run
Oct 10, 02
5 Targets

Engineering Work C² & Tactics

DDG 83 CSSQT HSMST Event
PMTC, Mar 02
Planned: GWS, CIWS BLK IB
Actual: GWS Non-Firing, CIWS BLK IB

DDG 82 CSSQT/801 DT HSMST
PMTC, Mar 02
Planned: GWS, Armed Helo, CDF, 5 Tgts
Actual: GWS, Armed Helo, CDF, 4 Tgts

Planned: Range
Actual: Engineering

DDG 81 CSSQT HSMST Event
AFWTF, Feb 02
Planned: GWS, 3 Target
Actual: Non-Firing/Ships RHIBS

Readiness Building Blocks

Goal: Successful OT

Verify Test Plan Can Be Executed, Range Can Support

Range Risk Reduction With Multiple Targets

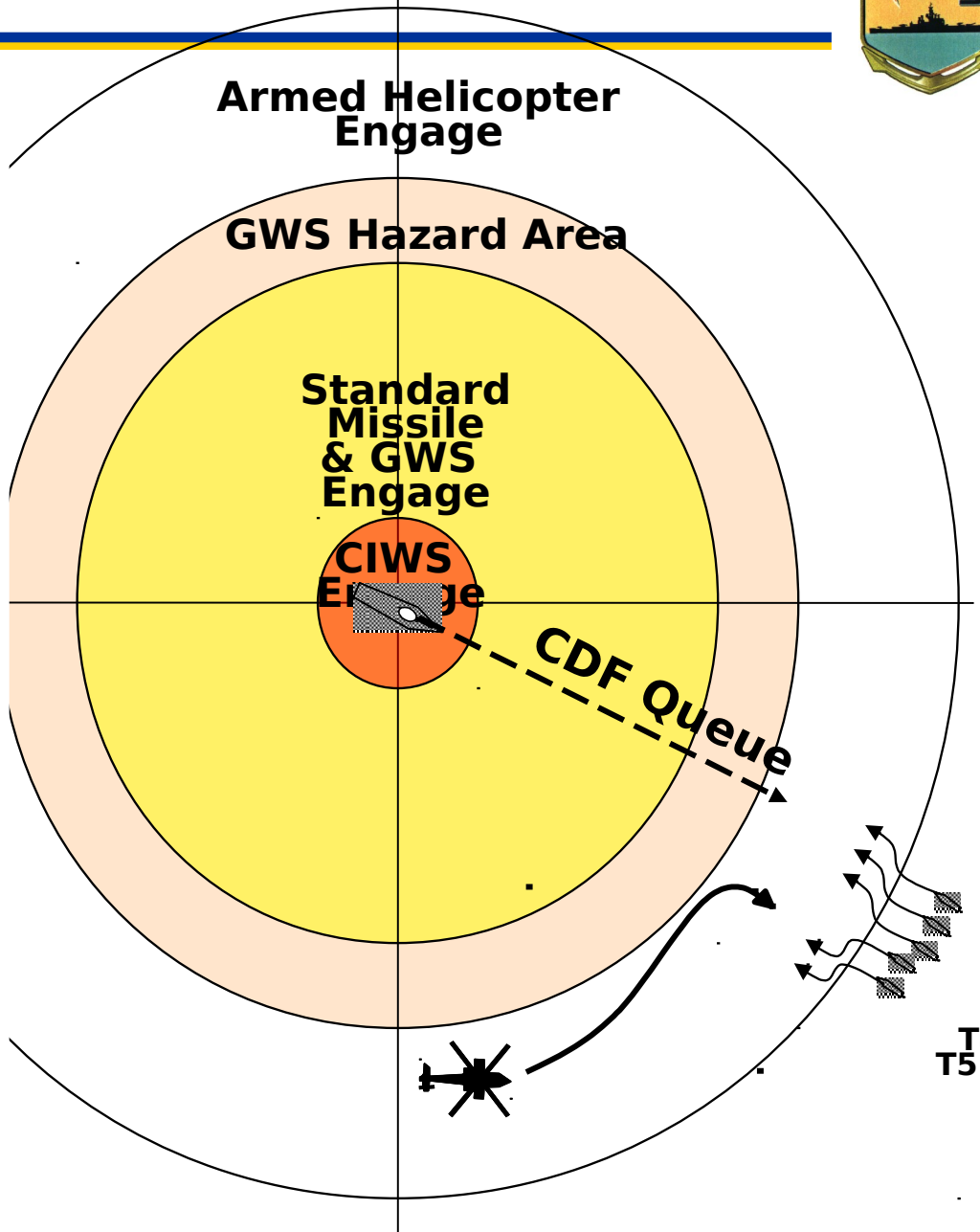
Provides Introduction of CIWS BLK IB Into Ship Defense Capabilities, Risk Reduction, Complex Scenario, Multiple Elements, Validate Procedure, Command/Control

Provides Test Plan Proof of Concept, Complex Scenario, Multiple Elements, Validate Procedure, Command/Control

Planned: Provide Range Risk Reduction Opportunity
Actual: **Identified HSMST Mode Issues**

DDG 84: HSMST DEVELOPMENTAL TEST

- **DT Events 11/4-5**
  - Manned Raid
  - Unmanned Raid
  - Live Fire Event 11/16
- **Present 5 HSMST RHIBs**
  - CDF Queue OTH
  - Armed Helo Search
- **Ship Coordinates Layered Defense:**
  - Helo w/ Hellfire Missiles
  - STANDARD missile
  - 5”/62 Gun
  - CIWS Blk 1B



SUMMARY

- **Conducting Small Boat Defense Testing Is More Complex Than Most Appreciate**
- **Operationally Meaningful Testing, With Measurable Results, is Critical to ID of Deficiencies/Solutions**
- **End-To-End Detect to Engage Evaluation Requires Holistic Organizational and Technical Approach**
- **Collaboration With Fleet, SWDG and OPNAV Leveraged Limited Resources to Address**

Build a Little, Test a Little, Learn a Lot